purposes, which was referred to the House Calendar and ordered to be printed.

□ 1945

ENERGY

The SPEAKER pro tempore (Mrs. BOYDA of Kansas). Under the Speaker's announced policy of January 18, 2007, the gentleman from Maryland (Mr. BARTLETT) is recognized for 60 minutes.

Mr. BARTLETT of Maryland. Madam Speaker, this is the 22nd time, I believe, that I have come here to the well of the House to talk about a subject which I think will be the overarching concern of our world for the next decades and several decades beyond that. That subject is energy and specifically the energy that we get from oil.

As an illustration of the problems we face, I have here a map of the world as it would be drawn if each country was sized relative to the amount of oil reserves that it had. So this is the world according to oil. And you see here Saudi Arabia, and it would swallow up the United States. How many times would it swallow us up, a dozen, 15 times?

Notice the incredible wealth of oil in the Middle East. Venezuela looms, what, two, three times the size of the United States as far as reserves of oil are concerned. The little United Arab Emirates, you can hardly find them on a map. They are kind of a little pinpoint on a usual map, and there they are six, eight times larger than the United States with their reserves of oil. The famed reserves of Russia up there. Notice that the United Arab Emirates have more oil than Russia has. And Saudi Arabia, of course, and Iraq. And little Kuwait, a little province that Saddam Hussein thought ought to belong to Iraq when he invaded it more than a decade ago, has many times as much oil as the United States and more oil than Russia has.

Remember this map when we put the next map of the world up here because this is an interesting map. And this is a map with the continents, the countries drawn relative to their actual size. And you will notice here the little symbols that represent several things, and one of them is oil that China has bought around the world. And this is Unocal, which they almost bought in our country. Everywhere you see this little symbol, the Chinese have bought rights to oil. They are scouring the world for oil.

And the next chart shows a statement by Condoleezza Rice, who recognized this. And this is a pretty interesting statement made by our Secretary of State: ''We do have to do something about the energy problem.''

Thank you. I am pleased that you recognize that.

''I can tell you that nothing has really taken me aback more as Secretary of State than the way that the politics of energy is. I will use the word wharping diplomacy around the world. We have simply got to do something about the wharping now of diplomatic effort by the all-out rush for energy supply.'' And, of course, China has been preeminent in this.

Several days ago I came upon an article. I have no idea why it took so long to come to light. It really is not an article. It really is the script of a speech that was given by Rear Admiral Hyman Rickover, the father of the nuclear submarine. And he gave this speech, it will be 50 years this coming May 14, 1957. He gave this speech to a banquet of the Annual Scientific Assembly of the Minnesota State Medical Association in St. Paul, Minnesota. And we will recognize, celebrate the 50th anniversary of that here in a relatively few months. That speech, by the way, was just 14 months and 6 days after a really famous speech that was given by M. King Hubbert in San Antonio, Texas, to a group of oil people in which he made a prediction that we will be talking about this evening, and that is that the United States would reach its maximum oil production just 14 years after that in 1970.

And right on target, that is exactly what happened. And no matter what we have done since then, we have pumped less oil than before until now we are pumping about half the oil that we pumped in 1970. He predicted that the world would be peaking about now, and that is the subject that brings us here tonight. I have a few excerpts here from this speech that he gave:

''High energy consumption has always been a prerequisite of political power. The tendency is for political power to be concentrated in an ever smaller number of countries. Ultimately the nation which controls the largest energy resource will become dominant. If we give thought to the problem of energy resources, if we act wisely and in time to conserve what we have and prepare well for necessary future changes, we shall ensure this dominant position for our own country.''

He said this 50 years ago: ''If we act wisely and in time,'' he says 50 years ago, ''to conserve what we have and prepare well for the necessary future changes, we shall ensure this dominant position for our own country.'' We have done nothing in the last 50 years except try to find more and more gas and oil and coal and use more and more of what we have found.

Another quote from this very interesting speech: ''In the 8,000 years from the beginning of history to the year 2000 A.D., world population will have grown from 10 million to 4 billion . . .''

Now, he missed it a little because we are at nearly 7 billion now.

'' . . . with 90 percent of that growth taking place during the last 5 percent . . . ''

Way more than 90 percent taking place during the last 5 percent of that period.

'' . . . in 400 years. It took the first 3,000 years of recorded history to accomplish the first doubling of population, 100 years for the last doubling, but the next doubling will require only 50 years.'' And it occurred well before that because we are now at nearly 7 billion people.

The next chart shows what he says in chart 4. If you were to plot population on this chart, it would pretty much follow the curve here for the increased use of gas and oil. This is only about 400 years of the 8,000 years that he spoke of, of recorded history. So you can move this way, way back a great long distance here to see the whole history of the world. In the long history of the world, 8,000 years of recorded history, the Age of Oil will last but about 300 years. We are about 150 years into the Age of Oil from when we started to where we are now. And if M. King Hubbert was correct, and he was correct about the United States, but if he is correct about the world, for the next 150 years there will be less and less oil pumped at higher and higher prices until finally, roughly 150 years from now, there will be little or no more gas, oil, and coal which is economically recoverable.

This is an astounding picture, and future generations looking back at this Age of Oil may very well ask themselves how could they have done that, this incredible wealth?

In a few minutes I am going to read a fascinating history, a very brief history of the world and energy that Hyman Rickover gave to those lucky physicians that night nearly 50 years. They will ask themselves how could they have done that when they found this incredible wealth under the ground? Couldn't they have understood that it couldn't last forever? Wouldn't they have asked themselves what can we do with this to provide the most good for the most people for the longest time? But instead of that, we simply have used that energy as rapidly as we could with little or no thought for the future.

Another quote from this very interesting talk: ''I suggest that this is a good time to think soberly about our responsibilities to our descendants, those who will ring out the Fossil Fuel Age.'' And he recognized 50 years ago that there would be a Fossil Fuel Age. ''We might give a break to these youngsters by cutting fuel and metal consumption so as to provide a safer margin for the necessary adjustments which eventually must be made in a world without fossil fuels.''

Less than a month ago I came back from China. Nine of us went there, nine Members of Congress. We went there primarily to talk about energy. We met with a number of relatively high officials in the Chinese Government. I was surprised in our discussions first with the energy people and then with others that they began their discussion of energy by talking about post-oil. Hyman Rickover 50 years ago anticipated that there would be a world without fossil fuels when we had gone through the Age of Oil.

The next chart is another quote from this very interesting speech: ''There is nothing man can do to rebuild exhausted fossil fuels reserves. They were created by solar energy.'' He says: ''500 million years ago it took eons to grow to their present volume. In the face of the basic fact that fossil fuel reserves are finite, the exact length of time these reserves will last is important in only one respect. The longer they last, the more time that we have to invent ways of living off renewable or substitute energy sources and to adjust our economy to the vast changes which we can expect from such a shift.''

What a speech. Fifty years ago when the United States was king of oil, the biggest consumer in the world, biggest producer in the world, and he recognized, as I think any rational person would recognize, that gas and oil and coal cannot be forever. It is finite. It one day will be gone. The only question is when, which is what we are here to talk about.

And this is a great quote here: ''Fossil fuels resemble capital in the bank. A prudent and responsible parent will use his capital sparingly in order to pass on to his children as much as possible of his inheritance. A selfish and irresponsible parent will squander it in riotous living and care not one whit how his offspring will fare.'' I will suggest that this is precisely what our offspring will accuse us of doing.

You know, there are only a few places that we believe there are any meaningful amounts of oil left. One of those is in ANWR and the other is in offshore drilling. The vast majority of experts in the world believe that we have probably found 95 percent of all the oil we will ever find. And notice that the new finds of oil are way out there, difficult to get, expensive to get. That big find in the Gulf of Mexico under 7,000 feet of water, roughly 50,000 feet of rock and dirt under that. I am told, and I don't know whether this is true or not, you can hear a lot of things, that when oil is $211 a barrel, they will be able to develop that because it will cost that much to get that oil out.

What I would like to do now is to take a look at some of the thoughts in this speech given by Hyman Rickover. I wish I had been a physician 50 years ago. I would have been 30 years old at that time sitting in that audience. He predated me by about 10 years in thinking about this problem. It was probably 40 years, and maybe because I am a scientist that I started asking myself the question: you know, Roscoe, oil and gas and coal are finite. They are not an inexhaustible supply. At some point in time, we will have to be concerned about those supplies. Is that 1 year, 10 years, 100 years, 1,000 years? I had no idea, when I first asked myself this question, how long that time would be, but I knew that a time had to come when we would be asking ourselves the question isn't it time that we should start thinking about this.

Just a few excerpts from this really interesting speech: ''Each American has at his disposal each year energy equivalent to that obtainable from eight tons of coal.'' Then coal was the primary energy source, a primary energy source, much less important now. Eight tons of coal, that is a lot of energy.

''With high energy consumption goes a high standard of living. Thus enormous fuel energy which we in this country control feeds machines which makes each of us master of an army of mechanical slaves.''

And notice these numbers, and these were 50 years ago. You decide how much this has changed today. ''Man's muscle power is rated at 35 watts continuously, or one twentieth horsepower.''

Now, you can do more than that in working, but you can't do it 24 hours a day, and this is a 24/7 figure.

''Machines therefore furnish every American industrial worker with energy equivalent to that of 244 men, while at least 2,000 men push his automobile along the road, and his family is supplied with 33 faithful household helpers. Each locomotive engineer controls energy equivalent to that of 100,000 men; each jet pilot of 700,000 men. Truly, the humblest American enjoys the services of more slaves than were once owned by the richest nobles and lives better than most ancient kings.''

□ 2000

''In retrospect'', he says, and this is 50 years ago, ''and despite wars, revolutions and disasters, the 100 years just gone by'', 150 now, ''just gone by may well seem like a Golden Age.'' And well they will when we look back on this.

''Whether this Golden Age will continue depends entirely upon our ability to keep energy supplies in balance with the needs of our growing population.'' He thought it would grow to 4 billion by this time. It is nearly 7 billion.

Before I go into this question, let me review briefly the role of energy resources in the rise and fall of civilizations. And I found this part of his speech just captivating, fascinating. ''Possessant of surplus energy is of course a requisite for any kind of civilization, for if man possesses merely the energy of his own muscles, he must exhaust all of his strength, mental and physical, to obtain the bare necessities of life.

''Surplus energy provides the material foundation for civilized living: A comfortable and tasteful home, instead of a bare shelter; attractive clothing instead of mere covering to keep warm; appetizing food instead of anything that suffices to appease hunger. It provides the freedom from toil without which there can be no art, music, literature or learning.

''There is no need to belabor this point. What lifted man, one of the weaker animals'', an interesting observation. We are really weak in muscle power. A chimpanzee the size of a man has four or five times the strength of a man. A dog has enormously better smell than you, the eagle infinitely better eyesight than you. Man is indeed one of the weaker animals.

''What lifted man, one of the weaker animals above the animal world was that he could devise with his brain ways to increase the energy at his disposal, and use the leisure so gained to cultivate his mind and spirit. Where man must rely on the energy of his own body he can sustain only the most meager existence.

''Man's first step on the ladder of civilization dates from the discovery of fire and his domestication of animals. With these energy resources, he was able to build a pastoral culture. To move upward to an agricultural civilization, he needed more energy. In the past this was found in the labor of the pendent members of large patriarchal families, augmented by slaves obtained through purchase or as war booty.

There are some backward communities which to this day depend on this type of energy, less today thankfully than there were 50 years ago. ''Slave labor was necessary for the city states and the empires of antiquity. They frequently had slave populations larger than their free citizenry. As long as slaves were abundant and no moral censure attached to their ownership, incentives to search for alternative sources of energy were lacking.

''This may well have been the single most important reason why engineering advanced very little in ancient times. A reduction of per capita energy consumption has always in the past led to a decline in civilization, and a reversion to a more primitive way of life.''

I would like to pause for just a moment to reflect on that. If all of the energy available to the United States was the energy from the United States, we would now be living on half of the energy that we had available in 1970. If you believe that the United States is a microcosm of the world, and if you believe that M. King Hubbert's analyses, which were so right on for the United States, are probably pretty good for the world, then the world now or very shortly will reach its maximum oil production.

After that, no matter what we do, there will be less and less oil available. And finally over the next 150 years, if the second half of the age of oil is as long as the first half, and M. King Hubbert found a bell curve in the exploitation and exhaustion of each of these oil fields, then we will have available to us less and less fossil fuel energy.

Now, unless we can contrive to replace that fossil fuel energy by alternative energy sources, we will have available to us year by year less energy than we had the year before.

And I was fascinated by Hyman Rickover's discussion of how energy contributed to the development of civilizations. And then he notes here, ''That a

reduction of per capita energy consumption has always in the past led to a decline in civilization and a reversion to a more primitive way of life.''

Will we be able to avoid that? Will we be able to create enough energy sources, other than fossil fuels, that we can replace the energy that will not be available from fossil fuels as we exhaust, slowly exhaust their supplies in the world?

For example, exhaustion of wood fuel is believed to have been the primary reason for the fall of the Mayan civilization on this continent, and of the decline of once flourishing civilizations in Asia. India and China once had large forests, as did much of the Middle East. Deforestation not only lessened the energy base but had a further disastrous effect. Lacking plant cover, soil washed away, and with soil erosion the nutritional national base was reduced as well.

It is a sobering thought to recognize that life on this planet is largely dependent on about the upper, on average, 8 inches of our soil. That is the top soils which grow our crops. And then he notes something that few people want to talk about, I am glad he had the courage to mention, that another cause of declining civilization comes with pressure of population on available land.

No matter how clever we are at developing other energy sources, if population continues to grow, and I will say that I am a 100 percent pro-life person. I think there are ways to control population without killing the preborn. And so when I read this, do not think that I am advocating that we need abortion to control population.

''A point is reached where the land can no longer support both the people and their domestic animals. Horses and mules disappear first. Finally, even the versatile water buffalo is displaced by man, who is 2½ times as efficient an energy converter as are draft animals. It must always be remembered that while domestic animals and agriculture machines increase productivity for man, maximum productivity per acre is achieved only by intensive manual cultivation.

''It is a sobering thought that the impoverished people of Asia—'' now this is less true today with a booming economy in China and a good economy in India, but this was true in that day. ''It is a sobering thought that the impoverished peoples of Asia who today seldom go to sleep with their hunger completely satisfied,'' 20 percent of the world will go to bed tonight hungry, ''were once far more civilized and lived much better than the people of the west.''

And not so very long ago either. It was a story brought back by Marco Polo of the marvelous civilization in China which turned Europe's eyes to the riches of the East and induced the adventurous sailors to brave the high seas in their small vessels searching for direct routes to the fabulous Orient, which, of course, brought Columbus to our shores.

The wealth of the Indies is a phrase still used. But whatever wealth may be there is certainly not evident in the lives of the people today. Now, the last 50 years have seen meaningful industrialization in that part of the world, which just has consumed increasing amounts of energy.

Asia failed to keep technological pace with the needs of her growing populations and sank into such poverty that in many places man has become again the primary source of energy. That was true then, it is still true in rural areas in these countries.

Since other energy convertors have become too expensive, this might be obvious to the most casual observer. What this means is quite simply a reversion to a more primitive stage of civilization, with all that implies for human dignity and happiness.

Anyone who has watched a sweating Chinese farm worker strain at his heavily laden wheelbarrow creeping along a cobblestone street, or who has flinched as he drives past an endless procession of human beasts of burden moving to market in Java, the slender women bent under mountainous loads heaped on their heads.

Anyone who has seen statistics translated into flesh and bone realizes the degradations of man's stature when his muscle power becomes the only energy source he can afford. Civilization must wither when human beings are so degraded.

Let me skip now to a little later in this very interesting talk. I think no further elaboration is needed to demonstrate the significance of energy resources for our own future. Our civilization rests on the technological base which requires enormous quantities of fossil fuels.

True 50 years ago, truer today. And then this statement. Now, underline this. Use red ink. What assurance do we then have that our energy needs will continue to be supplied by fossil fuels? The answer is, in the long run, none. The earth is finite. Fossil fuels are not renewable. In this respect our energy base differs from that of all earlier civilizations, which is why the Hirsch report says that man has never faced, the world has never faced a problem like this. There is no precedent in history.

In this respect our energy base differs from that of all earlier civilizations. They could have maintained their energy supply by careful cultivation. We cannot. Fuel that has been burned is gone forever. Fuel is even more effervescent than metals. Metals too are nonrenewable resources, threatened with ultimate extinction, but something can be salvaged from scrap. Fuel leaves no scrap. And there is nothing that man can do to rebuild exhausted fossil fuel reserves. They were created by solar energy, he says, 500 millions years ago and took eons to grow to their present volume.

I might pause here to note that those who belief in a literal flood believe that all of this occurred with the upheavals that occurred during the flood and the time since then. But most people believe that it took a very, very long time. In the face of the basic fact that fossil fuel reserves are finite, the exact length of time these reserves will last is important in only one respect.

The longer they last, and I am repeating one of the charts I had. But you know we need to hear this again because this is so significant. The longer they last the more time do we have to invent ways of living off renewable or substitute energy sources, and to adjust our economy to the vast changes that we can expect from such a shift.

Fossil fuels resemble capital in the bank. And I am going to repeat this again. This needs to be heard again too. A prudent and responsible parent will use his capital sparingly. Now have we been using this energy capital sparingly? Anything but. In order to pass onto his children as much as possible of his inheritance. A selfish and irresponsible parent will squander it in riotous living and care not one whit how his offspring will fare.

I am afraid that that is exactly what our children and our children's children will say of us when they recognize how little attention we paid to the warnings that we have been given for a very long time. This is Hyman Rickover 5 years ago, and just a year before that, M. King Hubbert and his prediction.

Engineers whose work familiarizes them with energy statistics, far-seeing industrialists who know that energy is the principal factor which must enter into all planning for the future, responsible governments who realize that the wellbeing of their citizens and the political power of their countries depend on an adequate energy supply, all of these have begun to be concerned about energy resources. Gee, I wish that were true.

If they began, then they stopped. Because I notice hardly anybody today is concerned about this problem. In this country especially, many studies have been made in the past few years. 50 years ago, seeking to discover accurate information on fossil fuel reserves and foreseeable fuel needs.

Now he may have been referring to the studies that were made by M. King Hubbert just the year before when he predicted that the United States would peak in oil production in 1970.

The chart that I have here kind of indicates to us the dimensions of the problem that Hyman Rickover was talking about and the problem we face.

□ 2015

The little analogy I use for this is that we are very much like a young couple whose grandparents have died and left them a big inheritance. And they have established a lifestyle where 85 percent of all the money they spend

comes from their grandparents' inheritance and only 15 percent from their income. And they look at how old they are and how large the inheritance is and they recognize, gee, it is not going to last till we retire, so, obviously, we have got to do something. Either we have got to spend less or we have got to make more.

I use that analogy because that is precisely where we are. Today, 85 percent of all the energy we use comes from coal and oil and natural gas, and just 15 percent of it from other sources. Now, you may lump all of those as renewables, but they are not quite because a bit over half of that, 8 percent of the 15, comes from nuclear power. In this country, that is 8 percent of our energy, but it is 20 percent of our electricity, so as you drive home tonight, imagine that every fifth home and every fifth business and every fifth street light was dark. That is what our country would be without nuclear power.

Now, we have had not a single death, no meaningful accidents. By the way, 3–Mile Island, and I lived within the drift zone of that, that worked. The containment facility worked. Too bad we had the accident, but good that we had prepared for it.

A lot of people are concerned about nuclear energy. But they really don't reflect on how many people die from coal, all the black lung disease. I remember a number of years ago when I worked for NIH and had a contract to look at respiratory support devices, and one of the places I went to was West Virginia, where they had a lot of black lung disease. And I talked to the physicians there that were dealing with these patients, and each year thousands died from black lung disease. It wasn't so much, and this is not really related to energy, but the real problem there was silicosis. But the lungs were black from the coal, and so it was called black lung disease, but it was really rock dust primarily which was the offender there.

How many miners are killed when the mine caves in or when it explodes? How many people are killed at the railroad crossing when the coal train goes by? We just seem to accept that as a part of the cost of having coal to use.

There have been no injuries, I remind the listeners, from our use of nuclear. We have had no Chernobyls, aren't going to have any because we have designed them much better, so this could and probably should grow.

Then we come to the true renewables. And there we see them, solar, and I am a big supporter of solar. I have a second home beyond the grid and we have only solar power. We are shortly putting up a wind machine because very frequently when the sun is not shining, the wind is blowing and so they complement each other very nicely.

But notice how tiny they were. This was 2000. Now we are better today because they have been growing very rapidly. So they are several times bigger today. But that was 1 percent of 7 percent, .07 percent. Suppose it is four times bigger today, .28 percent. Big deal. We have a long, long way to go.

Notice the contribution of wood. That is the timber industry and paper industry wisely using that waste product.

Conventional hydro. We have pretty much peaked out on that. There is maybe as much as we could get from unconventional hydro, microhydro, small streams where it wouldn't have the environmental effect that big dams have.

The waste to energy here, that is 8 percent of the 7 percent. That could certainly grow. It is probably a whole lot better to burn it than it is to put it in the land fill.

But note that this is really kind of recycling fossil fuel energy because, in an energy deficient world, there would be no enormous piles of municipal waste. They are all produced with energy; and as we have less and less energy, we will be able to live with less and less waste. So that will be a diminishing source of energy in an energy deficient world.

I want to take just a moment here to talk about ethanol. There are a couple of bills, and I will have it up here in a few moments, that look at developing ethanol. The price of corn, from which most ethanol is made in this country, was $2.11 a bushel in September. It was $4.08 a bushel in December. And that was because of the pressure of the demand for corn for producing ethanol.

Now, I didn't read it in this speech, but Hyman Rickover cautioned that if you are going to get energy from agriculture, please note that you will be competing with two things for that energy. One, you will be competing with food.

We eat some corn meal. Most of the corn goes to our animals, and our dairy farmers are really hurting now, because milk has not gone up much and their feed has gone up enormously because of the pressures put on corn by ethanol.

Every gallon of ethanol that we burn represents at least three-quarters of a gallon of fossil fuel to produce it. Almost half the energy in producing corn comes from the natural gas that produces the nitrogen fertilizer.

If we were to grow corn with energy from corn, which is the only fair way to look at corn as an energy source, otherwise you are simply recycling fossil fuels and growing the corn and making ethanol from it.

If we were to grow corn with energy from corn, and if you wanted to replace just 10 percent of our current gasoline consumption, I checked these figures with CRS, I think they are correct, you would have to double our corn crop and use it all for ethanol to displace just 10 percent of our gasoline.

What is very likely to happen now that corn has doubled in price is that farmers, recognizing that, gee, if I planted more corn I would make more money, they are going to take land out of agricultural preserve where it has been reserved by putting it in a bank, and it is land that probably shouldn't have been farmed anyhow, which is why they took it out, and the government helps pay them for that, which I am supportive of, by the way, because it helps preserve that land.

If they take that out and plant it to corn, corn is one of the worst crops for erosion. It is one of the heaviest feeders that we have, demanding more fertilizer than almost anything else. The insult to our environment by the erosion and so forth of this land as the result of more corn cropping, may offbalance, offset the benefit we get from the small decreased production of carbon dioxide, which is the primary reason most people are thinking about ethanol today, because of global warming and greenhouse gases.

And if you are simply releasing the carbon dioxide that the plant picked up, you have not increased the amount of carbon dioxide up there, because the plant took it out of the air. You are burning it and putting it back into the air. So it is a balance.

Hyman Rickover also cautioned, be careful about your expectations for energy from biomass. And today you will hear a lot of hype about energy from cellulosic ethanol. And this is a fascinating pursuit. Cellulose is made up of a lot of glucose molecules, simple sugar, half of the sucrose which is your table sugar. But they are so tightly bound together that there are no enzymes in our body which will separate them. In fact, the cow and the goat don't have any either. But they harbor in their gut some little critters that do have enzymes that do that. And so this is a great example of symbiosis. They both benefit from that relationship. These little microbes split the cellulose into the glucose molecules, and then they are absorbed by the host animals.

Hyman Rickover cautioned, be careful how much of this biomass you think you can take from the soil because it is biomass, organic material, which makes top soil different from subsoil.

There were three men from the Department of Agriculture in my office several months ago talking excitedly about the potential for cellulosic ethanol. And I asked them if our top soils were increasing in quantity and quality. And the answer is obviously, no.

We are really good today compared to how we were 20, 30 years ago. But I am told that for every bushel of corn you grow in Iowa, three bushels of Iowa top soil go down the Mississippi River, which is why we have such a big delta down in Louisiana.

Well, these little microbes that exist in the gut of these animals we have now learned to bioengineer so we can do this in the laboratory. So we can now turn newspaper into alcohol and run your car on newspaper. That is doable. But be careful how much energy

you expect to get from that because for a few years you may mine the top soil, but soon you will decrease the product activity of the top soil. So there is a limit to that.

So what do we do? The next chart, we buy time. How do you do that?

I mentioned that I have been to China, came back 3 or so weeks ago. And they begin all of their discussions by talking about post-oil. And they have a 5-point plan. And it is not just the energy people. It is every member of government we talked to talked about this 5-point plan. So they recognize that energy is a real challenge for them.

The 5-point plan begins with conservation. You see, today there is no surplus oil. There is no surplus energy to invest in developing alternatives. If there was any surplus oil, it wouldn't be $55 a barrel.

So we have run out of time. We have run out of energy, but we can buy some time and free up some energy if we have an aggressive program in conservation. This is where they began their 5-point program: conservation.

Two and three were produce as much of your own energy as you can, and diversity will help. Don't put all your eggs in one basket. And the fourth one, a really good one, especially for them, be kind to the environment. They were apologetic. They are not kind to the environment, but they have 1.3 billion people who are clamoring for the kind of life style we have and want to go climb up that economic ladder and they aren't using energy very efficiently, and we need to help them.

The fifth point, a really interesting one, international cooperation. They recognize that this isn't a U.S. problem or a Chinese problem. This is a global problem because oil moves on a global marketplace. It doesn't really matter who owns the oil. The person who has the highest bid gets the oil. It sells to the people who have the money to buy it. And when it is in short supply, there is more demand for it, so the price goes up.

Once we have bought some time and freed up some energy, then we need to use it wisely. I think one of the things that we need is an ARPA-E. Many people know what DARPA is. It is an agency in our Defense Department that looks at far-out, really interesting things. They developed the Net, for one thing. And they invest in things that industry couldn't invest in because there is no imminent payoff, not even certain there will be any long-term payoff. You are running down a lot of dead roads. But, boy, when you hit it, you hit it big. And DARPA has been very creative. And we need something like that in the energy world because there are some things that may be big, big producers tomorrow, which may not be attractive to investors today.

I am a big fan of the marketplace, but the marketplace is neither omniscient nor omnipotent, and there is a role for government here. And I am one of the biggest small government people in Washington. But, you know, we ought to get the government out of things that are not productive and put them into things where they are productive.

And looking ahead and wisely deciding what some reasonable risk is and investing the taxpayer money has paid big dividends in DARPA, and I think it would in ARPA-E. Big benefits to this. We are now an incredible importer. I think this year the trade deficit we were $800 billion or something like that. We could again become a major exporter. The world is going to be clamoring for these renewable technologies, and we could be a leader in this.

□ 2030

Whether we like it or not, we are a role model. We are one person out of 22 in the world, and we use one-fourth of the world's energy. So we are a witness, we are a role model whether we like it or not.

There are a couple of bills that I wanted to mention. This is our bill, and I am proud of this bill because if we can't do this, we are in for a really rough ride. This is a bill that encourages our farms to become energy independent. Not just energy independent, because if that is all they did, then the people who live in the cities would be in a world of hurt when we run out of fossil fuels.

But the farmer must be able not only to produce enough energy to run his farm, but have some leftover energy, and I think this challenges him to produce as much leftover energy as he uses on his farm. And there are some rewards for farmers who can do this. There are a lot of creative ways we can do this, and we hope that these awards will challenge people to be as creative and innovative as Americans have always been, and I am looking forward to some very exciting developments here.

The next chart has some data on it that I referred to previously. There is nothing like seeing it in a pretty colored chart. We can look at the top part of the chart. And petroleum, of course, if you start out with 1 million Btus, you won't have 1 million Btus to burn because you have got to pump it and refine it and transport it and put it in your car and so forth. So to get 1 million, you must start out 1.23 million.

Here we look at ethanol, and there is a big advantage here because you get solar energy. These, I am told, are very optimistic figures. Dr. Pimental believes that if you look at all the energy input into producing corn, that more energy goes into producing corn than you get out of corn. I hope that is not true. Most people believe that it is energy positive.

You know, even if it were just balanced, once you have taken the ethanol out, you have left some really good feed. Tragically, many of the ethanol plants today carry that to the landfill. What a shame, almost a crime, because all the fat is left, all the corn oil is left, and all the protein is left. All we have taken out is the carbohydrate.

What this says is, as I have mentioned previously, for every gallon of ethanol you burn, you are burning at least three-fourths of a gallon of fossil fuels. That is a fossil fuel input. Now, this down here depicts the fossil fuel input. I mentioned that almost half of it, this big purple area here, comes from the natural gas that produced the nitrogen fertilizer.

Before we learn how to do that, by the way, the only nitrogen fertilizer—as a little kid I remember that pretty much the only nitrogen fertilizer was barnyard manures and guano. And you took the manure out of your barnyard, you spread it out on your fields, and the fertilizer attachment on your tractor was about three times as big as the seed, the corn bin. You put very little fertilizer on it. But now we have learned to make enormous—we mine the phosphate rock and the potash and we make nitrogen fertilizer as incredibly energy intensive, as you can see. All of these are other fossil fuel energy inputs, making the tractor, fueling the tractor, putting the tires on the tractor, harvesting the grain, hauling it to market, drying it, the chemicals that go into killing the bugs and so forth on it.

An incredible amount of energy goes into producing a bushel of corn. And if you were going to grow corn with energy from corn—I gave you the statistics a little bit earlier—I believe that you would have to double your corn and use it all for ethanol to displace just 10 percent of our gasoline.

That is an illustration of the huge challenge that we face. We use 21 million barrels of oil a day in this country, 70 percent of it in transportation. Each barrel of oil, as Hyman Rickover so graphically described, represents an enormous amount of human energy. One barrel of oil represents the work of 12 people working all year. For less than $10 you can hire a guy who is going to work all year for you. These are part of those 33 faithful household servants that Hyman Rickover said our energy use provided to the average family.

The next chart shows another energy bill, the DRIVE bill. This was dropped just very recently. We love acronyms down here, and this is a bill that has to do with transportation fuels, Dependable Reduction through Innovation and Vehicles and Energy Act, H.R. 670. I didn't sign on to any energy bills last year. There were some pretty good bills, but somewhat, not just somewhat, enormously exaggerated claims were made for them; and I did not want to give credibility to unrealistic expectations from these bills.

The next chart here quotes several people: Petroleum expert Colin Campbell. By the way, he kind of inherited the mantle from M. King Hubbert. He is kind of the godfather today of all of these scientists. Jean Laherrare, Ryan

Fleeley, Roger Blanchard, Richard Duncan, Albert Bartlett, no relative of mine. But if you put Albert Bartlett, do a Google search for Albert Bartlett and Energy, and you will put out the most fascinating 1-hour lecture I have ever listened to. He has given it more than 1,600 times. I will tell you, there will be no thriller on television that will be as interesting as Albert Bartlett's 1-hour lecture on energy. You will be captivated by it. They have all estimated that a peak in conventional oil production will occur at around 2005. This is now 2007.

By the way, the world oil production has been roughly 84 million, 85 million barrels a day for the last several years. That may or may not mean we have reached peak, but at least there has been a plateau. And if it weren't for a fact that there has been a 40 percent reduction of gasoline use in many South American countries, for instance, because it has just gotten too expensive, the price of oil would be far greater than roughly $55 a barrel today.

This has been what they call demand destruction. If you can destroy demand, you can reduce the price. And when it got too expensive to use, they just quit using it, so the price of oil has dropped because there is less pressure.

The next chart shows a number of experts and what they have predicted, and here are some of them there, Campbell and Goldstein and Deffeyes, Skrebowski, Simmons. Matt Simmons is an investment banker, a personal energy adviser to the President. They all believe that it is going to occur very shortly. The previous list had it in roughly 2005, these in the next decade and these further down. Now, CERA is one here that says it is going to be after 2020.

I want to show you the next chart here, and this is a CERA chart; and CERA believes that we will find maybe several times as much more energy as all the energy that now is known, all the oil that we now know is out there. They think we will find two or three times that much more oil.

Now, if we find only 5 percent more oil, then this will be when it peaks. If we find as much more oil as all that exist out there, this will be when it peaks. It still is not forever, it still is about 2040. And if we now are able to get enormous amounts of oil from these unconventional sources, the Canadian tar sands; and don't call it oil, please, it is tar, and the oil sands out in our west, and I don't know that we will ever achieve this, by the way. The Canadians are getting 1 million barrels a day, just a little over 1 percent of production, using incredible amounts of energy, incredible amounts of water, producing a big lake that they call tailing water; it is really toxic water, and they know that what they are doing is not sustainable because they don't have enough natural gas to produce the energy.

They are thinking about putting in a power plant. The vein, I understand, dips under an overlay so they will have to develop in situ, and they don't know how to do that. Enormous reserves, more than all the oil in the world potentially, are out in our West. Shell Oil Company had a little experiment out there. They said it would be 2013, I think, before they said they could even make a decision as to whether it was economically feasible to get that. So this is a huge ''if'' here.

The next chart is an interesting one. One of the world's experts in this, Jean Laherrare, made an assessment of the USGS report. What I was looking at was not a USGS report, but they were basing their prognosis on USGS data, so this comment is appropriate to that chart as well. The USGS estimate implies a fivefold increase in discovery rate and reserve addition through which no evidence is presented.

Such an improvement in performance is, in fact, utterly implausible given the great technical achievements of the industry over the past 20 years, the worldwide search, and the deliberate efforts to find the largest remaining prospect. We have computer modeling in 3–D seismic and enormously improved techniques for finding oil, and still every year we find on the average less oil than we found the year before.

This is a very heartening chart. As we face an energy-deficient world, I often think of this chart and the promise that it gives us. On the abscissa here we have energy consumption per capita here, and on the ordinate we have perception of how good life is. Now, it is not perfect for anybody, but there are a whole bunch of people who think that it is about 85 to 95 percent as good as paradise can be.

And notice where we are. We are the biggest users of energy. Little Switzerland is close behind us. But what this chart tells me is that you can use far less energy and be pretty happy with where you are. These many people, by the way, use less energy than we and are happier with their lives than we are, everybody above this imaginary line.

And notice that if you have very little energy, it is tough to feel good about life. As soon as you reach 25 percent, as much as we use, then you can feel pretty good, 80 percent compared to 90 percent, not much improvement for an incredibly large increase in energy. So this gives us hope.

Europe uses per capita about half as much energy as we use, and if you have traveled to Europe, nobody who has traveled to Europe believes that they live less well or are less content with their life than we are.

The next chart shows an interesting, and this is one of many, many, opportunities for efficiency, but this is such a dramatic one. This is the efficiency of getting light. And this is the old incandescent bulb, a red hot hairpin hung up in a bottle is the way one old farmer described it. And this is the amount of heat you produce, which is why you use it as a brooder for fish and to keep them warm, and baby chickens, and this is the light you get, 90 percent heat, 10 percent light.

This is fluorescence, which is why you have the little screw in fluorescence. A great Time magazine article that showed that each one of those bulbs saved a quarter of a ton of coal. And here is the light-emitting diode. I have a light-emitting diode flashlight; I have forgotten when I put the batteries in. They just last and last.

I have a couple of charts here, and we have only a few minutes remaining, and I just want to show a couple of them to refer you to very big studies paid for by our government, ignored by our government. One is the Corps of Engineers, and this is the Corps of Engineers study, and the other is the big Hirsch Report. You can find all of those on the Web. In fact, you can go to our Web site and either find these or find the link to it.

In general, all nonrenewable resources follow a natural supply curve. Production increases rapidly, slows, reaches a peak, and then declines at a rapid pace, remember, to its initial increase.

The major question for petroleum is not whether production will peak but when. There are many estimates of recoverable petroleum reserves giving rise to many estimates of when peak oil will occur and how high the peak will be. A careful review of all the estimates leads to the conclusion that world oil production may peak within a few short years.

This was paid for by the Army, essentially ignored by everybody.

The next one, a bigger study, paid for by our Department of Energy, SAIC, a big, prestigious organization: We cannot conceive of any affordable government-sponsored crash program to accelerate the normal replacement schedules to fill the gap created by a decline in oil production.

I won't use any more of these charts because the others, I have a dozen or so more, simply say the same thing, that one way or the other, in different words, we are either at or shortly will be at peak oil with potentially devastating consequences.

There is hope with leadership. We are an enormously creative society. I think that we can meet the challenge, but it is going to require a program I believe that has a total commitment of World War II, I lived through that, that has the technology challenge of putting a man on the moon and the urgency of the Manhattan Project. We can do that. It needs the help of every American, and leadership; our children and grandchildren are counting on it.

LEAVE OF ABSENCE

By unanimous consent, leave of absence was granted to:

Mr. WOLF (at the request of Mr. BOEHNER) for today on account of testifying before the Virginia State Corporation Commission on the proposed tolling for the Dulles Greenway.